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July 12, 2001
Job No.: 21-4198-02-001

Mr. Paul Kieffer
GWF Power Systems
4300 Railroad Avenue
Pittsburg, California 94565

SUBJECT: Geotechnical Engineering Services
Proposed Henrietta Peaker Plant
One Mile South of Highway 198 on Avenue 25
Lemoore, California

Dear Mr. Kieffer:

Kleinfelder is pleased to present the this report on general geotechnical and geologic conditions for the proposed Henrietta Peaker Plant to be located one mile south of Highway 198 on Avenue 25 in Lemoore, California. We understand, the proposed project will involve construction of an electrical power plant located on an approximate 400 by 550-foot parcel. The purpose of our investigation was to explore the subsurface conditions at the site and provide comments regarding site soil and groundwater conditions, regional and local geology, site seismicity, liquefaction, and pertinent geologic hazards to aid in preparing the environmental component of a California Energy Commission application for the proposed plant. The location of the site is shown on the attached Site Vicinity Map, Plate 1.

Our scope of services was based on your request as discussed in telephone discussions and included excavating a boring to 75 feet below surrounding grade and preparation of this letter report.

FIELD EXPLORATION

The field exploration was conducted on July 2, 2001, and consisted of drilling 1 exploratory test boring and conducting a site reconnaissance by our staff engineer. The test boring was drilled with a CME 55 truck-mounted drill rig, using mud rotary drilling techniques to a depth of 76.5

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feet below the existing ground surface. Penetration rates were recorded and soil samples gathered on 5-foot intervals. The approximate location of the test boring is indicated on the attached Site Plan, Plate 2.

SITE CONDITIONS

Surface

The site is located on Avenue 25 approximately one mile south of Highway 198. The site consists of a relatively flat 5-acre parcel located adjacent to the existing PG&E Henrietta Substation. The site is bounded on the south and east by agricultural property, on the west by 25th Avenue, and on the north by the substation. The site has been used for agricultural purposes. At the time of our investigation, the site had recently been deep disced, disturbing the upper 12 to 18 inches. The surface soil is randomly cracked due to desiccation of clayey soil.

Existing utilities consisted of fiber optic cables trending along 25th Avenue and several overhead power transmission lines diagonally bisecting the site.

Subsurface

The surface soil materials encountered in our test borings consisted of soft to stiff lean clay extending to a depth of about 33 feet. These clay soils were underlain by alternating layers of medium dense silty sand and poorly graded sand extending to a depth of about 46 feet. These sand soils were underlain by medium stiff to very stiff lean clay extending to a depth of about 72 feet. Between 72 feet and the bottom of the boring (approximately 76.5 feet) the soil encountered consisted of medium dense silty sand with slight plasticity.

Groundwater was encountered in the test boring drilled for this project at a depth of about 6 feet below surrounding grade. This depth to groundwater is not uncommon, as the area is known for shallow groundwater. It is possible that groundwater conditions at the site could change at some time in the future due to variations in rainfall, agricultural activities, groundwater withdrawal, construction activities, or other factors not apparent at the time our test boring was made.

The above is a general summary of the soil and groundwater conditions encountered in the test boring excavated for this investigation. A more detailed description of the soils encountered in the test boring is noted on the log of boring, Plate 4. All soils have been classified in general accordance with the Unified Soil Classification System described on Plate 3.

GEOLOGIC CONDITIONS

Regional Geology

The project site lies in the central portion, and near the west side of the Great Valley geomorphic province in central California. This province of California was formed by the filling of a large structural trough or downwarp in the underlying bedrock. The trough is situated between the Sierra Nevada Mountains on the east and the Coast Range Mountains on the west. Both of these mountain ranges were initially formed by uplifts, which occurred during the Jurassic and Cretaceous periods of geologic time (greater than 65 million years ago). Renewed uplift began in the Sierra Nevada during the Tertiary time, and is continuing today. The trough, which underlies the valley, is asymmetrical, with the greatest depths of sediments near the western margin. The sediments that fill the trough originated as erosional debris from the adjacent mountains and foothills.

Local Faulting

The project site and its vicinity are located in an area traditionally characterized by low to moderate seismic activity. Faulting and seismic ground shaking is usually associated with known fault systems. Based on a review of the area's Five County Seismic Safety Element (1974), and our current understanding of the geologic framework and tectonic setting of the proposed facility, there are no known faults which traverse through the local soils in or near the site, and the site is not located in an Alquist-Priolo Earthquake Fault Zone as defined by Special Publication 42 (revised 1997) published by the CDMG. The primary source of seismic shaking is anticipated to be the Coast Ranges Sierran - Block Fault zone.

Site Seismology

A deterministic modeling procedure was used to estimate the peak ground motion corresponding to the maximum credible earthquake. The deterministic analysis is based on characteristics of the earthquake and of the causative fault associated with the earthquake. These characteristics include such items as magnitude of the earthquake, distance from the site to the causative fault, and the effects of site soil conditions. The governing event would be a Magnitude 7 earthquake on the Coast Ranges – Sierran Block Fault zone. This fault is located about 38 km westerly of the site and would produce a ground acceleration of about 0.18g. This value may be somewhat conservative, in that CDMG is presently considering this fault zone to be a series of smaller segments with associated lower magnitudes for the segments.

Liquefaction

Evaluation based on methods by Seed, Tokimatsu, Harder and Chung (1985) and NCEER (1996) indicate a maximum seismic event on the Coast Ranges Sierran - Block Fault would not likely result in liquefaction of the saturated granular sediments.

A primary potential effect of strong seismic motion is seismically induced settlement. Based on the subsurface data associated with this study and methods by Tokimatsu and Seed (1987) and the NCEER (1996), it is estimated that seismically induced settlement might occur in various granular zones between about 38 and 46 feet in depth. It is estimated this settlement would be less than 1.0-inch. Consequently, considering the significant depth, it is anticipated the seismically induced differential settlement at the surface would not be significant.

OTHER GEOLOGIC HAZARDS

Landslides and Ground Failure

Strong shaking has the potential for activating landslides on hillsides, slope failures on creek banks (lurch cracking) and tension cracking in areas underlain by loose, low density soil such as uncompacted fill. Since the site is level and there are no known areas of extensive fill or filled-in or existing creek banks, the potential for landslides or other slope failures from earthquake-induced ground shaking is low.

Tsunamis, Seiches, and Earthquake Induced Flooding

Tsunamis are sea waves of unusual size that occur from significant earthquakes either under the ocean floor or adjacent to shorelines and can travel great distances to impact low-lying communities and developments. Since the site is protected from the sea by the Coast Range, the potential for the site to be affected by a tsunami is nil.

A seiche is a free or standing-wave oscillation that occurs in a confined body of water, such as a reservoir or lake. Earthquake-generated ground waves, which have a period that matches the natural period of the lake or reservoir, may cause the water to oscillate, which can cause damage to shore line improvements. The County General Plan does not address the potential of seiches. No nearby large bodies of water are present from which a seiche would influence the site. Potential inundation due to upstream dam failure is not addressed in the General Plan. The seismic adequacy of dams are usually governed by the U.S. Corp of Engineers and California Division of Dam Safety.

Flooding

Based on the Flood Insurance Rate Maps (No. 0600860125 B, October 4, 1988) distributed by the Federal Emergency Management Agency, the site is located in Zone X. Zone X denotes areas outside of the 500-year floodplain.

LIMITATIONS

Comments contained in this report are based on our field observations and subsurface exploration and our present knowledge of the general area.

We have prepared this report in substantial accordance with the generally accepted geotechnical engineering practice as it exists in the site area at the time of our study. No warranty is expressed or implied.

This report is intended to be used by the client and their consultants only for the purposes stated, within a reasonable time from its issuance. Land use, site conditions (both on site and off site) or other factors may change over time. Any party other than the client or their designers who wish to use this report shall notify Kleinfelder of such intended use. Based on the intended use of the report, Kleinfelder may require that additional work be performed and that an updated report be issued. Non-compliance with any of these requirements by the client or anyone else will release Kleinfelder from any liability resulting from the use of this report by any unauthorized party.

We appreciate the opportunity to provide geotechnical engineering services to GWF Power Systems. We trust this information meets your current needs. If there are any questions concerning the information presented in this report, please contact this office at your convenience.

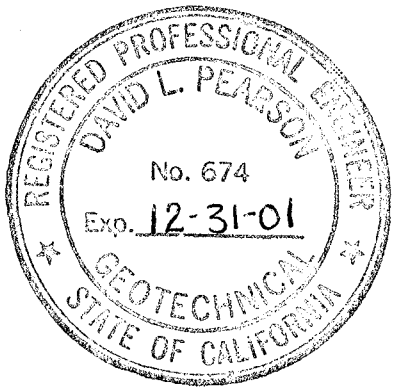
Sincerely,

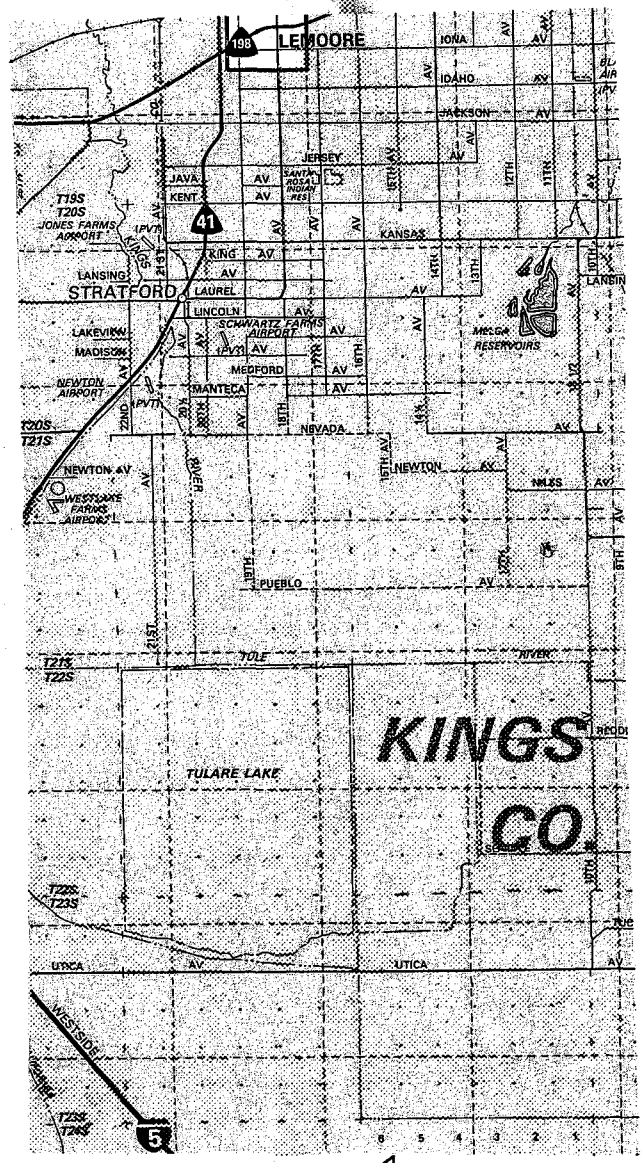
KLEINFELDER, INC.

Stephen P. Plauson, E.I.T.
Project Engineer

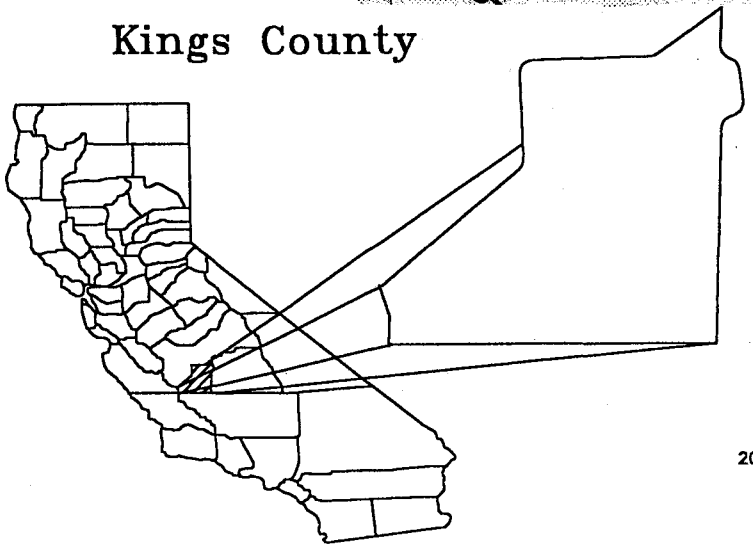
David L. Pearson, P.E., G.E.
Senior Project Manager

SPP:DLP:tjg



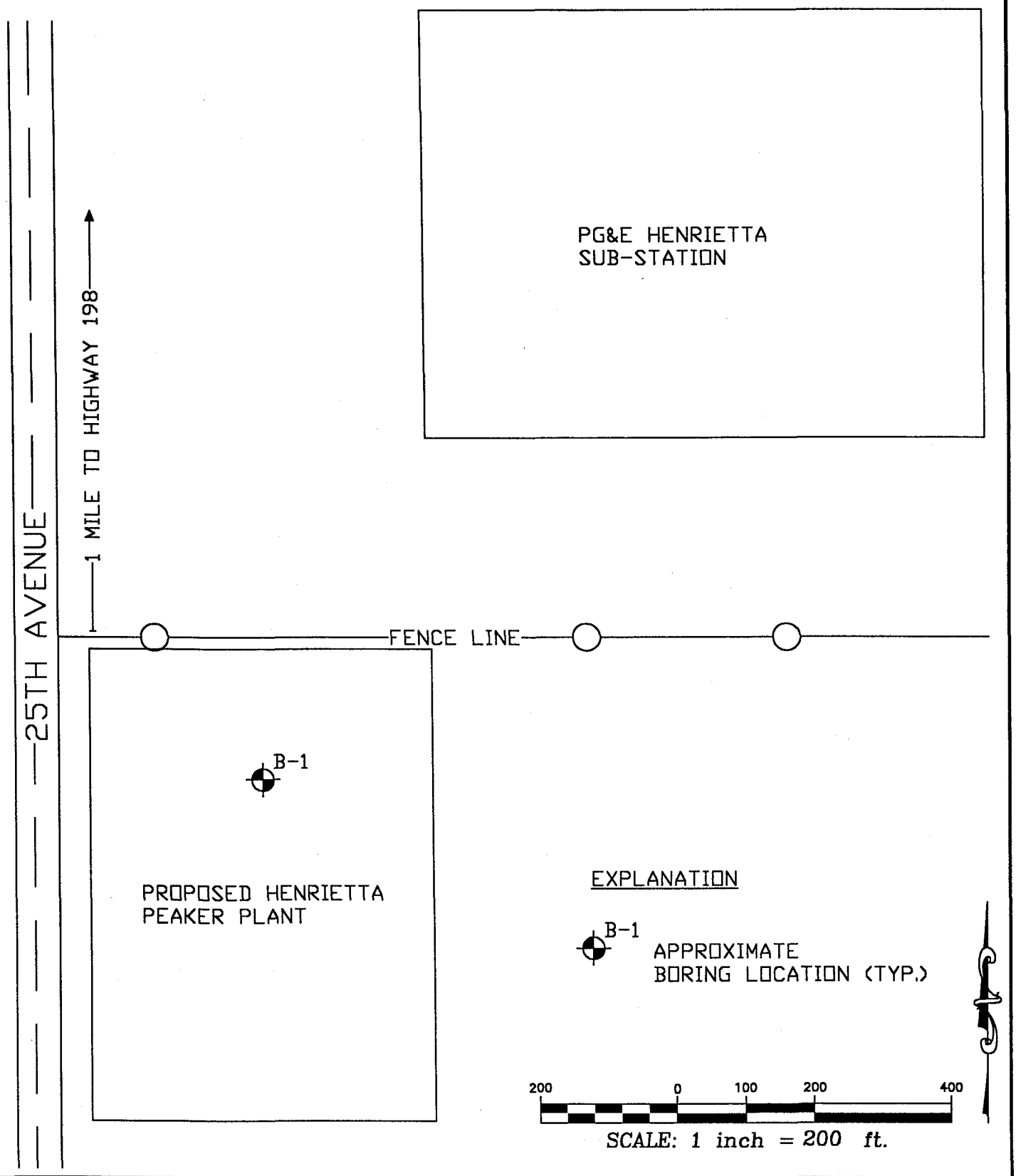


Kings County



SCALE: 1 inch = 2000 ft.

KLEINFELDER	SITE VICINITY MAP PROPOSED HENRIETTA PEAKER PLANT POWER SYSTEM LEMOORE, CALIFORNIA	PLATE 1
DRAWN BY: D. NORMAN PROJECT No. 21-4198-02	DATE: 7-3-01 DWG No. site_vic	



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DRAWN BY: D. NORMAN	DATE: 7-3-01
PROJECT No. 21-4198-02	DWG No. site_plan

SITE PLAN
PROPOSED HENRIETTA PEAKER PLANT
POWER SYSTEM
LEMOORE, CALIFORNIA

PLATE
2

LOG SYMBOLS

BULK/BAG SAMPLE

MODIFIED CALIFORNIA SAMPLER
(2-1/2 inch outside diameter)

CALIFORNIA SAMPLER
(3 inch outside diameter)

STANDARD PENETRATION
SPLIT SPOON SAMPLER
(2 inch outside diameter)

SHELBY TUBE SAMPLER
(3 inch outside diameter)

CONTINUOUS SAMPLER
(3 inch outside diameter)

WATER LEVEL
(level after completion)

WATER LEVEL
(level where first encountered)

SEEPAGE

-4	PERCENT FINER THAN THE NO. 4 SIEVE (ASTM Test Method C 136)
-200	PERCENT FINER THAN THE NO. 200 SIEVE (ASTM Test Method C 117)
LL	LIQUID LIMIT (ASTM Test Method D 4318)
PI	PLASTICITY INDEX (ASTM Test Method D 4318)
EI	EXPANSION INDEX (ASTM Test Method D 4829)
COL	COLLAPSE POTENTIAL
UC	UNCONFINED COMPRESSION
MC	MOISTURE CONTENT

GENERAL NOTES

1. Lines separating strata on the logs represent approximate boundaries only. Actual transistions may be gradual.

2. No warranty is provided as to the continuity of soil conditions between individual sample locations.

3. Logs represent general soil conditions observed at the point of exploration on the date indicated.

4. In general, Unified Soil Classification designations presented on the logs were evaluated by visual methods only. Therefore, actual designations (based on laboratory tests) may vary.

5. A temporary benchmark for relative elevation was located at:

KEYLOG 21419802.GPJ 7/5/01

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LOG KEY
PROPOSED HENRIETTA PEAKER PLANT
GWF POWER SYSTEM
LEMOORE, CALIFORNIA

PLATE
3

Date Completed: 7/2/01
Logged By: S. PLAUSON
Total Depth: 76.5 feet

Surface Conditions: OPEN FIELD- TILLED
Rig Type: CME -55 Auger Type: M/R
Groundwater: 6.0 ft.

Depth, ft	FIELD: Sample	FIELD: Blows/ft	LABORATORY: Dry Density pcf	LABORATORY: Moisture Content %	LABORATORY: Approx. Satura-tion %	LABORATORY: Sample Number	Pen, tsf	DESCRIPTION
								Approximate Relative Surface Elevation (ft):
								CLAY (CL) - olive brown, dry, soft, desicatted to about 12 to 18 inches
								... moist
								... very moist to wet
5		3						
		5						... wet, medium stiff
								... groundwater observed at 6 feet
10		8						
15		16						... very stiff
20								

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LOG OF BORING B-1
PROPOSED HENRIETTA PEAKER PLANT
GWF POWER SYSTEM
LEMOORE, CALIFORNIA

PLATE
1 of 4

4

Depth, ft	FIELD Sample	FIELD Blows/ft	LABORATORY Dry Density pcf	LABORATORY Moisture Content %	LABORATORY Approx. Satura-tion %	LABORATORY Sample Number	Pen, tsf	DESCRIPTION
								(Continued from previous plate)
		22						... stiff
25		11						...sandy, fine to coarse grained
30		10						... with sand interbeds
35		14						**SILTY SAND (SM)** - olive brown, wet, medium dense, fine grained
40		13						**POORLY GRADED SAND (SP)** - olive brown, wet, medium dense, fine to medium grained
								SILTY SAND (SP) - oilve brown, wet, medium dense, fine grained

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LOG OF BORING B-1
PROPOSED HENRIETTA PEAKER PLANT
GWF POWER SYSTEM
LEMOORE, CALIFORNIA

PLATE
2 of 4

4

Depth, ft	FIELD: Sample	FIELD: Blows/ft	LABORATORY: Dry Density pcf	LABORATORY: Moisture Content %	LABORATORY: Approx. Saturation %	LABORATORY: Sample Number	Pen, tsf	DESCRIPTION
								(Continued from previous plate)
								POORLY GRADED SAND (SP) - olive brown, wet, medium dense, fine grained
45		11						**CLAY (CL)** - olive brown, wet, medium stiff
50		20						...
55		13						...
60		24						... very stiff
65								...

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LOG OF BORING B-1
PROPOSED HENRIETTA PEAKER PLANT
GWF POWER SYSTEM
LEMOORE, CALIFORNIA

PLATE
3 of 4
4

Depth, ft	FIELD: Sample	FIELD: Blows/ft	LABORATORY: Dry Density pcf	LABORATORY: Moisture Content %	LABORATORY: Approx. Satura-tion %	LABORATORY: Sample Number	Pen, tsf	DESCRIPTION
								(Continued from previous plate)
		27						...
70		16						**SILTY SAND (SM)** - olive brown, wet, medium dense, fine grained, slight plasticity
75		23						**Notes:** **1.) Bottom of boring at 76.5 feet.** **2.) Free groundwater encountered at 6.0 feet.** **3.) Boring backfilled with soil cuttings 7/2/01.**
80								
85								

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LOG OF BORING B-1
PROPOSED HENRIETTA PEAKER PLANT
GWF POWER SYSTEM
LEMOORE, CALIFORNIA

PLATE
4 of 4